

STUDIES ON THE MICROPROPAGATION OF FOUR *Zantedeschia* CULTIVARS

XIAO Tiao - Jiang, LI Heng, LONG Chun - Lin, XIA Li - Fang

(Kunming Institute of Botany, Chinese Academy of Science, Kunming 650204, China)

Abstract Four *Zantedeschia* cultivars, namely "Golden Calla", "Pixie", "Pink Persusion" and "Black Magic", were used for this study. By only changing the concentration of zeatin in Murashige and Skoog mineral medium, good results of micropropagation of *Zantedeschia* can be achieved even without any other rooting phytohormone in the medium. The basic steps and the medium are given out as follows: 1) shoot multiplication by adding 1 to 3 mg/L of zeatin to MS medium; 2) shoot elongation by adding 0.2 to 0.4 mg/L zeatin into MS medium; 3) rooting by adding 0.05 to 0.2mg/L zeatin to MS medium.

Key words Micropropagation, *Zantedeschia*, cultivar.

INTRODUCTION

Zantedeschia belongs to Araceae. Its cultivars such as "Golden Calla", "Pixie", "Pink Persusion" as well as "Black Magic" are either important for cut flower production or suitable for pot plants.

The variability of *Zantedeschia* cultivars by seed propagation is very great. Traditional propagation would involve cutting tuberous rhizomes into sections, but it only can result in 10 to 20 fold increase per year, moreover, soft rots caused by the bacterium *Erwinia aroideae* can easily enter the wound area and cause severe economic losses.

For the present time, it seems that the micropropagation method is most suitable for *Zantedeschia* propagation.

There have been some reports of micropropagation methods for genera of Araceae: *Anthurium*, *Caladium*, *Dieffenbachia*, *Monstera*, *Philodendron*, *Scindapsus*, *Spathiphyllum* and *Syngonium*. However, only a little work has been done with *Zantedeschia*.

METHOD AND MATERIAL

Four *Zantedeschia* cultivars, namely "Golden Calla", "Pixie", "Pink Persusion" and "Black Magic" were used for this study. Bud sections were dipped into 70% ethanol before buds were removed from the rhizome with a sharp knife during the dormant phase (November and December in Kunming). The bud sections were treated in 0.1% mercuric chloride for 6 min, then washed 5 - 6 times with sterile water. A small piece of tube containing the apical meristem was cut out for culture.

The results of our preparation experiment indicated that it was easy to develop roots of *Zantedeschia* cultivars even without supplementing with rooting phytohormone. For the purpose of comparison, different concentrations of zeatin were supplemented into the MS mineral medium.

RESULTS AND DISCUSSION

1. Shoot Multiplication

On the initial medium, buds expanded rapidly and in many cases proliferated from axillary buds on the side of the explant.

After about 2 – 3 weeks, a bud section developed into a small highly compressed bud mass. Without any phytohormone, the number of axillary buds per bud section is rather low, about 2.5 for each (Table 1). By supplementing with zeatin, the higher the concentration, the more the axillary buds (Table 1). Up to 4 mg/L, the number of the induced axillary buds from one bud section reached its maximum. If more than 5 mg/L was used, the explant formed a large clump. Moreover it was difficult to root the clumps after transferring to rooting medium. The result in this paper showed that medium containing 1 to 3 mg/L of zeatin is best suited for shoot multiplication of *Zantedeschia*.

Table 1. Influence of zeatin concentrations of shoot multiplication of *Zantedeschia*
(counted after initiated 3 weeks)

Concentration of zeatin (mg/L)	No. of bud section	No. of axillary buds produced per section	Average number of axillary buds produced from one bud
0	25	37	1.5
0.05	26	75	2.9
0.1	25	95	3.9
0.5	25	127	5.1
1	25	165	6.6
2	27	178	6.6
3	26	202	7.8
4	25	229	9.1
5	25	forming clumps	

2. Shoot Elongation

After 3 weeks, proliferation can be enhanced by splitting the main bud longitudinally.

The high zeatin concentration in the medium usually inhibits development of roots, so, it is necessary to transfer the bud to a medium containing lower zeatin concentration. The influence of different zeatin concentration on shoot elongation of *Zantedeschia* is shown in Table 2.

On the elongation medium individual buds expand but only some concentration in medium is lower than 0.1 mg/L. when the zeatin dominant buds appeared from each bud climp. In the case of higher than 1 mg/L, like the shoot multiplication, only axillary buds come out, no new dominant buds can be found. For the purpose of easy buds. Thus, the medium containing 0.2 to 0.4 mg/L zeatin is best for shoot elongation of *Zantedeschia*.

3. Rooting

After they were cultured for 4 weeks, the buds on the elongation medium could be individually removed for rooting and a small buds returned to the elongation medium for a further month.

In our preparation experiment, it was found that most cultivars of *Zantedeschia* can develop roots on rooting medium without any rooting phytohormone.

After about 3 weeks cultures on rooting medium, the dominant buds begin to develop roots. Rooting usually occurs within two weeks. The effect of zeatin concentration on rooting of *Zantedeschia* is shown in Table 3.

Table 2. Influence of different zeatin concentrations on shoot elongation of *Zantedeschia*
(counted after elongated 3 weeks)

Concentration of zeatin (mg/L)	No. of bud masses	No. of new dominant buds	Average number of axillary buds produced from one bud
0	25	0	0
0.01	25	70	2.8
0.05	25	90	3.6
0.1	25	105	4.2
0.2	25	123	4.9
0.3	25	130	5.2
0.4	25	133	5.3
0.5	25	152	6.1
0.6	25	axillary bud	

Table 3. Influence of different zeatin concentrations on rooting of *Zantedeschia*

Concentration of zeatin (mg/L)	No. of bud	No. of roots produced	Average number of axillary buds produced from each bud
0.01	25	30	1.2
0.02	25	35	1.4
0.03	25	55	2.2
0.05	25	78	3.1
0.1	25	90	3.6
0.2	25	76	3.0
0.3	25	57	2.3
0.4	25	45	1.8

The above result indicated that the medium containing 0.05 to 0.2 mg/L zeatin is best for rooting of *Zantedeschia*.

CONCLUSION

For field planting, a large number of plants is needed, thus, culture initiation, multiplication and rooting of shoots developed for *Zantedeschia* should be simple and quick. In our study, an ideal micropropagation system has been achieved. One to three mg/L of zeatin is best for shoot multiplication of *Zantedeschia*, 0.2 to 0.4 mg/L zeatin for shoot elongation, 0.05 to 0.2 mg/L zeatin for rooting.

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